

The Myriapod Types of Oscar Harger (Arthropoda: Diplopoda, Chilopoda)

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ABSTRACT—The type specimens of all five milliped species—*Trichopetalum lunatum*, *T. glomeratum*, *T. iuloides*, *Iulus furcifer*, and *Polydesmus armatus*—and one of the two centipedes, *Lithobius pinetorum*, authored by Oscar Harger in his only paper on myriapods and previously thought to be lost, are housed at the Peabody Museum of Natural History, Yale University, New Haven, Connecticut. From our knowledge of the itinerary of the Yale paleontological expedition of 1871, we know the type locality of *T. glomeratum*, *I. furcifer*, *P. armatus*, and *L. pinetorum*, previously stated as the “John Day River Valley, Oregon” is restricted to the vicinity of Canyon City, Grant County, on the western slope of the Blue Mountains. The female holotype confirms that *T. glomeratum* is a representative of the chordeumatoid family Conotylidae, and the name is assigned provisionally to *Taiyutyla* pending collection of a male topotype. Unidentifiable female conotylids are also reported from another area in eastern Oregon and the Snake Mountains in eastern Nevada, which suggests that the family is widespread in montane forests at high elevations in the generally arid Columbia Plateau and Basin and Range Physiographic Provinces. To facilitate future studies, I provide gonopod drawings of male syntypes for *I. furcifer* and *P. armatus*.

One of the more obscure authors of North American myriapods is Oscar Harger (1843–87), whose sole publication on these arthropods (Harger 1872) described the milliped genus *Trichopetalum* and seven species, two centipedes (*Lithobius pinetorum* and *Geophilus gracilis*) and five millipeds (*Trichopetalum lunatum*, *T. glomeratum*, *T. iuloides*, *Iulus furcifer*, and *Polydesmus armatus*).

Born at Oxford, Connecticut, Harger attended the Connecticut Literary Institute at Suffield and Yale College, graduating from the latter with honors in 1868 (Schuchert and LeVene 1940). After briefly studying zoology under Professor A. E. Verrill, Harger became the first assistant to the vertebrate paleontologist, O. C. Marsh, participating on the latter's expeditions into the American West in 1871 and 1873. From July to September 1872, Harger dredged marine organisms on a Coast Survey steamer with Professors Verrill and Sydney I. Smith, Yale's first professor of Comparative Anatomy, who earlier had been naturalist to the U.S. Lake Survey and collected the types

of *T. iuloides*. Harger was studious and an active reader, and Marsh valued his scientific opinions in paleontology. However, Marsh would not allow Harger to publish on vertebrate fossils, either alone or jointly with him, so Harger's only papers are on invertebrates—that of 1872 on myriapods, two on isopods, and one on a fossil spider.

From 1870 to 1873, Marsh led four vertebrate paleontological expeditions of Yale students and recent graduates into the West (Schuchert and LeVene 1940). The idea of such efforts arose from preliminary explorations he made on a trip to the end of the transcontinental railroad in Wyoming in August 1868 after attending a scientific meeting in Chicago. The 1871 expedition traveled to regions of Kansas, Wyoming, and Utah, where Harger collected 10 fossil species. The group then rested a few days in Salt Lake City with Brigham Young while Marsh prepared to explore a new area, the John Day River Basin in central Oregon. After traveling 12 days by rail and stage, the party crossed the Blue Mountains and arrived at Canyon City, Oregon, on the John Day River on 17 October 1871, where it waited several days for a military escort from Fort Harney, 75 mi (120 km) to the south. The group collected fossils from 31 October to 8 November in the John Day region before traveling down the Columbia River to Portland; it then traveled to San Francisco and returned east directly by rail or by boat via Panama.

While the expedition was in the John Day River area, Harger, or Harger and Professor G. H. Collier, collected four Oregon myriapods that he described in 1872—*L. pinetorum*, *T. glomeratum*, *I. furcifer*, and *P. armatus*. Both the publication and labels in the vials give the locality as just the "John Day River Valley," but knowledge of the group's activities enabled me to infer a more precise site. The John Day River arises on the western slope of the Blue Mountains in Grant and Umatilla counties, flows westward into Wheeler County, then heads northward to the Columbia River forming the boundaries between Wheeler/Wasco and Sherman/Gilliam counties. It is not to be confused with Days Creek, Douglas County, in the Umpqua River drainage of southwestern Oregon, the probable type locality for *Zantona douglasia* Chamberlin and *Bollmanella oregona* Chamberlin (Shear 1974, Gardner and Shelley 1989), which Chamberlin (1941a) misnamed as "John Day Creek." Because most millipeds require moist leaf litter and much of the John Day Basin is in the arid rain shadow of the Cascade Mountains, I (Shelley 1990) speculated that the site was probably near the confluence of the John Day and Columbia rivers in either Sherman or Gilliam county. However, as all the myriapods were collected in October 1871, and the expedition reached Canyon City on 17 October and only collected fossils from 31 October to 8 November

after waiting for the military escort, it is evident that during most of the part of October that the group was in the John Day Valley, it was resting in Canyon City. Consequently, there was ample time for relaxed explorations in the vicinity of Canyon City, and I, therefore, believe that Harger's myriapods were collected near this town. Because Harger's paper specifies that *L. pinetorum*, *I. furcifer*, and *P. armatus* were collected by Professor Collier and himself, and *T. glomeratum* was taken by Harger alone, collecting probably occurred on at least two different dates, as one day Harger went out alone and the other he was accompanied by Collier. There could be as few as one site and as many as four, but further specification is not possible with what we know now. Consequently, the type locality for all of Harger's Oregon species is restricted to the vicinity of Canyon City, Grant County, on the western slope of the Blue Mountains.

Harger's centipedes have received little attention since their description. They were included in the catalog of North American myriapods by Bollman (1893), who noted that *G. gracilis* Harger, 1872, was preoccupied by *G. gracilis* Meinert, 1870, proposed for a European geophilomorph. Cook and Collins (1891) remarked that Harger's description of *G. gracilis* conformed very closely to *Schendyla nemorensis* (C. L. Koch, 1837), and the former is now regarded as a junior synonym (Crabill 1953, 1961). Stuxberg (1875) included *L. pinetorum* in his list of North American lithobiids, but he had no personal knowledge of the species. Kevan (1983a) listed both species as potential inhabitants of Canada, recognizing the synonymy of *G. gracilis* under *S. nemorensis*.

In contrast to the centipeds, Harger's millipeds have been cited in a number of publications, but the type specimens were thought to be lost. Chamberlin and Hoffman (1958) stated that their "present location [was] unknown" or that they were "not known to exist," and similarly, Shear (1971, 1972) said that the holotypes of *T. glomeratum* and *T. iuloides* were lost and that the whereabouts of that of *T. lunatum* was unknown. Causey (1967) guessed right when she stated that the holotype of *T. lunatum* was at the "Peabody Museum of Natural History, Yale University, if extant," but evidently she made no inquiries to confirm this supposition. While recently visiting the Peabody's Museum's collection, I unexpectedly discovered these types in the myriapod cabinet, where they have languished in obscurity for 120 years. A few vials were still capped with wax and had not been touched for decades. The types of *P. armatus* were in the general collection and not labeled as such, but those of the other millipeds were clearly marked as types and grouped in a clamp-top jar. A concerted search failed to reveal the types of *G. gracilis*, which ap-

parently are lost, but those of *L. pinetorum* were in an individual vial and clearly labeled. The sample consists of 12 nearly legless syntypes, seven males and five females, and is number 2175; according to the label it was collected by Harger alone, whereas the published account states that it was collected by him and Professor Collier.

All the millipeds are listed in the continental checklist (Chamberlin and Hoffman 1958), and detailed accounts of those Harger assigned to *Trichopetalum* have recently appeared (Palmen 1952; Shear 1971, 1982; Shelley 1988, In Press).

In the following accounts I update these reports by providing information on the type specimens, a brief historical review of each species, and pertinent anatomical observations. Complete synonymies are presented, and each species is placed in its proper order and family.

Chordeumatida: Trichopetalidae

Trichopetalum lunatum Harger

Trichopetalum lunatum Harger, 1872:3, pl. II, figs. 1–4. Ryder, 1881:527. Packard, 1883:192. McNeill, 1888:8. Cook and Collins, 1895:63–64, pl. III, figs. 52–54. Williams and Hefner, 1928:115, fig. 12d. Causey, 1951:119, figs. 6–8; 1967:80, fig. 1. Palmen, 1952:8–11, figs. 10–17. Chamberlin and Hoffman, 1958:102–103. Shear, 1972:277, figs. 497–499. Kevan, 1983b:2967. Shelley, 1988:1650.

Trichopetalum album Cook and Collins, 1895:64–66, pls. II–III, figs. 22–29, 36–45. Chamberlin and Hoffman, 1958:102.

Type Specimens—Five male and nine female syntypes (nos. 2208–2209) collected by O. Harger in May 1872 at New Haven, New Haven County, Connecticut; one male and one female syntype (no. 2125) taken by an unknown collector on an unknown date at Mt. Carmel, ca. 7 mi (11.2 km) north of New Haven, New Haven County.

Remarks—Harger assigned three new species to his genus *Trichopetalum* but did not specify the type species, so Cook and Collins (1895) subsequently designated *T. lunatum*. It is the only one of Harger's five milliped species to retain its original combination. The identity of *T. lunatum* has been well established by Cook and Collins (1895), Palmen (1952), Causey (1967), and Shear (1972); a male syntype from New Haven that I dissected conformed to these

accounts. For details of the genitalia, refer to the illustrations in Palmen (1952) and Shear (1972).

Chordeumatida: Conotylidae

Taiyutyla glomerata (Harger), new combination

Trichopetalum glomeratum Harger, 1872:118, pl. II, fig. 5. Ryder, 1881:527. Packard, 1883:192. McNeill, 1888:8. Chamberlin and Hoffman, 1958:105. Shear, 1971:63.

Craspedosoma glomeratum: Bollman, 1893:120.

Conotyla glomerata: Cook and Collins, 1895:78. Cook, 1904:69.

Type Specimen—Female holotype (No. 2173) collected by O. Harger in October 1871 from the vicinity of Canyon City, in the John Day River Valley, Grant County, Oregon.

Remarks—The holotype is somewhat deformed, and its genitalia have been dissected and are lost.

Cook and Collins (1895) stated that the original description was too brief to allow accurate generic placement but that the segment number, short fifth antennomere, and triangular eye patch resembled the condition in *Conotyla*. Shear (1971) agreed that accurate generic placement was impossible but perceived a similarity to *Taiyutyla*; he did not think the name could be referred to either *Trichopetalum* or *Conotyla* and considered it a *nomen dubium*. The holotype is about 8 mm long and has 30 post cephalic segments with obvious lateral tergal knobs that give rise to two prominent setae, so it is clearly a conotylid. Generic placement is impossible to determine with certainty until a male topotype is obtained, but the millipede is smaller and its lateral setae are much longer than those of comparative specimens of *Conotyla atrolineata* (Bollman), the western-most known representative of this genus, occurring in central British Columbia, northeastern Washington, and northern Idaho, over 200 mi (320 km) north northeast of Canyon City. These considerations tend to exclude *Conotyla*, but the type locality is also well removed from most of the known distributions of the other northwestern conotylid genera *Bollmanella* and *Taiyutyla*, which are from southern coastal Oregon to Mason County, Washington, and in the Coast Ranges from San Francisco Bay to the Columbia River, respectively (Shear 1974, 1986). However, one species in each of these genera occurs east of the above ranges, *B. bifurcata* Shear, in the Wallowa Mountains, Wallowa County, Oregon, and *T. curvata* Loomis and Schmitt, in Lincoln County, Montana, so either genus could occur in the Blue Mountains, which occupy an intermediate

geographical position between the Coast Range and both the Wallowa Mountains and Montana. Furthermore, Canyon City is only about 110 mi (176 km) southwest of the type locality of *B. bifurcata*. Therefore, I borrowed the types of both *B. bifurcata* and *T. curvata* for direct comparisons with that of *glomerata*. Few setae remain on the types of *B. bifurcata*, and those that do exist, on the caudal end of the male holotype, seem shorter and are not nearly as prominent as are those on *glomerata*. However, the setae on *glomerata* agree closely in length and prominence with those on the holotype of *T. curvata*. There is reasonable agreement in body dimensions between *glomerata* and both other conotylids, but because of the similarity in the setae, I provisionally assign *glomerata* to *Taiyutyla*, pending collection of a male topotype. This change, which formalizes Shear's (1971) perception of similarity to *Taiyutyla*, also necessitates the feminine suffix of the specific name. Fieldwork is needed in the Blue Mountains to collect a male conotylid to determine the identity and generic position of *glomerata* and to confirm or disprove this decision.

Present evidence shows that the Conotylidae is much more widespread in the West than currently known. There is a female in the Florida State Collection of Arthropods from 12.5 mi (20 km) south of Baker City, Baker County, Oregon, that might be conspecific with *glomerata*, although this site is east of the Blue Mountains and presumably is drier than Canyon City. I also recently received two female conotylids that are superficially very similar to *glomerata* from the Snake Mountains, White Pine County, Nevada, in the eastern part of that state and hundreds of kilometers from any known site for the family. These two records plus *glomerata* suggest that conotylids could be scattered across the arid Columbia Plateau and Basin and Range Physiographic Provinces, where they are undoubtedly restricted to cooler, forested regions at high elevations. The Ruby Mountains near Elko, Nevada, is another plausible area for conotylids, as are ranges in the central part of that state. Because only a few millipeds of any family have ever been collected from the "inselberg" mountains of these provinces, a concerted field effort is needed to both clarify the systematic positions of these conotylids and document the total diplopod fauna.

Chordeumatida: Caseyidae
Underwoodia iuloides (Harger)

Trichopetalum iuloides Harger, 1872:118. pl II, fig. 6.

Trichopetalum juloides: Ryder, 1881:527.

Trichopetalum iuloides: Packard, 1883:192.

Trichopetalum iuloides: McNeill, 1888:8.

Chordeuma iuloides: Bollman, 1893:121.

Underwoodia polygama Cook and Collins, 1895:80–82, pl. X, figs. 180–190. Paleman, 1952:2–8, figs. 1–9a. Chamberlin and Hoffman, 1958:107. Kevan, 1983b:2968.

Underwoodia iuloides: Cook and Collins, 1895:83–84, pl. X, figs. 177–178. Chamberlin and Hoffman, 1958:107. Kevan, 1983b:2968. Shelley, 1988:1648–1649; In Press:

Type Specimens—Eight female syntypes (No. 2207) collected by S. I. Smith in 1871 at Simon's Harbor (misspelled as Simmon's) on the north shore of Lake Superior, Ontario, Canada. This site is now in Pukaskwa National Park.

Remarks—A review of *Underwoodia* with a description, discussion, and illustrations of *U. iuloides* is in press. For details on this species, see Shelley (1988).

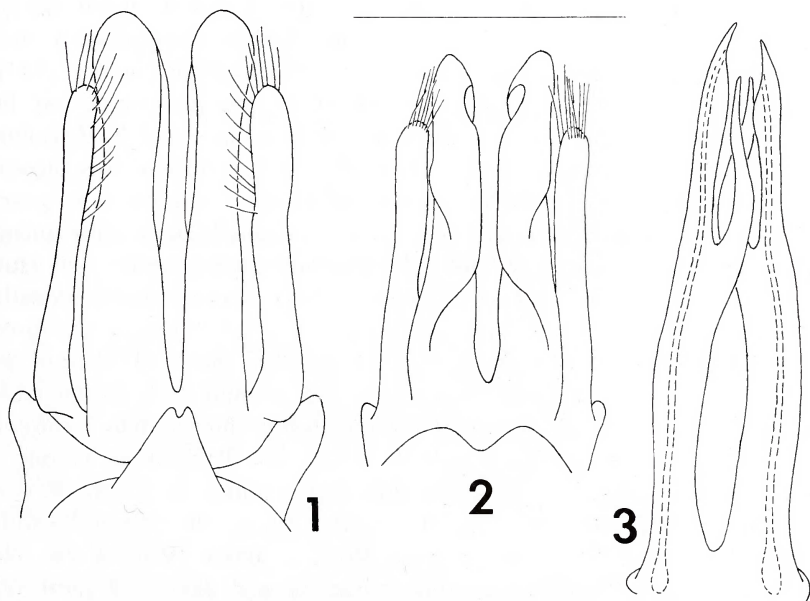


Fig. 1–3. *Bollmaniulus furcifer*, male syntype. 1, anterior gonopods, anterior view. 2, the same, posterior view. 3, posterior gonopods, anterior view. Scale line = 2.2 mm for figs. 1–2, 1.6 mm for fig. 3.

Julida: Parajulidae
Bollmaniulus furcifer (Harger)

Figs. 1–3

Iulus furcifer Harger, 1872:119, pl. II, fig. 7.

Parajulus furcifer: Bollman, 1887:44. Cook, 1904:70–71, pl. V, figs. 5a–e. Chamberlin, 1920:35.

Paraiulus furcifer: Brolemann, 1895:69, pl. 7, figs. 21–23.

Bollmaniulus furcifer: Verhoeff, 1926:65. Chamberlin and Hoffman, 1958:133. Buckett, 1964:18. Kevin, 1983b:2964.

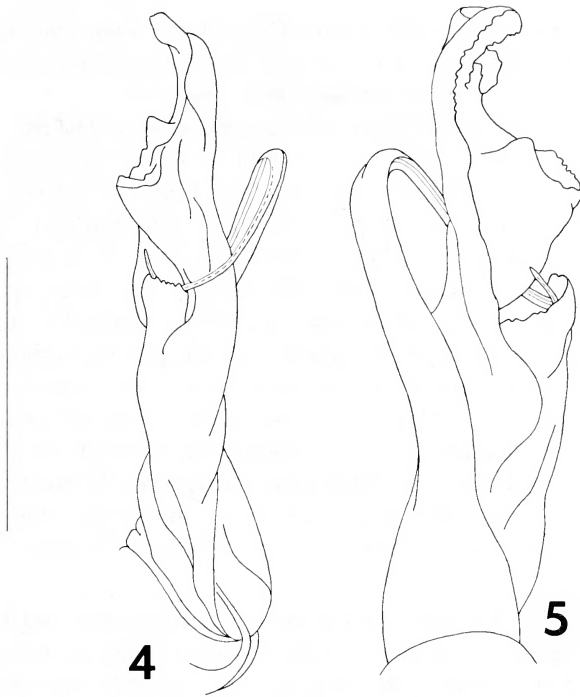
Taijulus furcifer: Chamberlin, 1938:205.

Caliulus furcifer: Chamberlin, 1940:15; 1944:80.

Type Specimens—Three male and 13 female syntypes (No. 2172), most highly fragmented, collected by O. Harger and G. H. Collier in October 1871 from the vicinity of Canyon City, in the John Day River Valley, Grant County, Oregon.

Remarks—Bollman (1887) transferred this species into *Parajulus*, misspelled as *Paraiulus* by Brolemann (1895), and Cook (1904) recorded it from Corvallis, Oregon. Chamberlin (1920) reported it from Claremont, Los Angeles County, California, surely a misidentification of another, possible congeneric parajulid. Verhoeff (1926) listed *furcifer* as the only component of his new genus *Bollmaniulus*, thereby making it the type species by monotypy as reported by Jeekel (1971). He did not specifically designate *furcifer* as the genotype, so this status does not result from original designation, as stated by Chamberlin and Hoffman (1958). Chamberlin (1938, 1940) evidently was unaware of Verhoeff's action when he transferred *furcifer* into his new genera *Taijulus* and *Caliulus*, respectively, both of which have subsequently been placed in synonymy under *Bollmaniulus* (Chamberlin and Hoffman 1958, Hoffman 1979). Chamberlin (1944) repeated the combination *C. furcifer* for a form from McCloud, Siskiyou County, California, and added that the species was common over much of Oregon and California. Buckett (1964) recognized the combination *Bollmaniulus furcifer* and stated that it ranged from British Columbia into California.

As noted by Hoffman (1979, 1992), the Parajulidae is one of the two most dominant Nearctic diplopod families in terms of component genera and species, the other being the Xystodesmidae (Polydesmida). It was studied from 1948 to about 1974 by Dr. Nell B. Causey, who amassed a large collection and examined most type specimens while conducting a detailed family revision. Unfortunately, she never completed the project and published only a few brief papers before her death in 1979. Consequently, knowledge of the Parajulidae is not nearly as advanced as those of the other major Nearctic diplopod families. Work on the taxon must essentially begin anew, a daunting task because of the diversity of the family and the enormous amount of preserved material in nearly every major and minor milliped repository on the continent. The types of *I. furcifer* will be crucial to an investigation of Pacific parajulids, because as the eighth oldest generic name in the family, *Bollmaniulus* has priority over such other nominal Pacific



Figs. 4-5 *Chonaphe armata*, male syntype. 4, telopodite of left gonopod, medial view. 5, the same, lateral view. Scale line = 1.14 mm for fig. 4, 1.0 mm for fig. 5.

genera as *Saiulus*, *Spathiulus*, *Sophiulus*, *Codiulus*, and *Simiulus*, all authored by Chamberlin (1940), *Tuniulus* (Chamberlin 1941b), and *Mulaikiulus* (Chamberlin 1941a), so additional generic synonymies could result from a study of these western forms. For the benefit of future students, I have included drawings of the gonopods of a male syntype (Figs.1-3).

Polydesmida: Xystodesmidae

Chonaphe armata (Harger)

Fig. 4-5

Polydesmus armatus Harger, 1872:119-120, pl. II, fig. 8.

Leptodesmus armatus: Bollman, 1893:122. Chamberlin, 1911:264.

Chonaphe armata: Cook, 1904:56-57, pl. III, figs. 2a-c. Attems, 1931:65-67, figs. 100-101; 1938:156, fig. 177. Chamberlin, 1949:125. Chamberlin and Hoffman, 1958:27. Kevan, 1983b:2968. Shelley, 1990:2314.

Type Specimens—One male and two female syntypes, all highly fragmented, collected by O. Harger and G. H. Collier in October

1871 from the vicinity of Canyon City, in the John Day River Valley, Grant County Oregon. This sample was discovered in the general milliped collection and is unnumbered.

Remarks—Harger's single gonopod illustration enabled Cook (1904) to recognize that a male sent to him from an unknown locality in Washington was referable to *armatus*. Bollman (1893) had earlier transferred *armatus* to *Leptodesmus*, a combination repeated by Chamberlin (1911), but Cook (1904) assigned it to his new genus, *Chonaphe*, a combination that subsequently has been recognized by Attems (1931, 1938), Chamberlin (1949), Chamberlin and Hoffman (1958), and Shelley (1990). Cook (1904) provided three additional genitalia drawings, and I include here medial and lateral views of the gonopod of a male syntype (Figs. 4–5). Five nominal species comprise *Chonaphe*, but Hoffman (1979) thought these might be subspecies. I (Shelley 1990) found few significant differences between these forms and concluded that the genus might be monotypic with *C. armata* being the oldest name. I am preparing a generic revision.

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